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ABSTRACT

In the Federal Republic of Germany, apprenticeship is the preponderant form of vocational training. The basis of the training is a private legal contract between the trainer and the trainee. The practical part of the training takes place in the training firm from 3 to 4 days per week, and the theoretical part takes place in a vocational school 1 or 2 days each week. Economic, labor market, and technological development has a profound effect on both the demand for and the offer of work-related vocational training. The influence of technological advancement both on the occupational structure and on the relative demands for certain types of jobs and levels of skill are already being felt in the workplace. The changes that are currently underway in the German economy and labor market are making it increasingly necessary that vocational training provide more (1) basic occupational education, such as that which has traditionally been the province of general education; (2) training in the areas of abstraction, thinking and planning skills, and cooperation; and (3) technical work-related training, perhaps in the form of vocational instruction by correspondence. It is particularly important that the latter be provided for vocational instructors and teachers. (MN)

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# DEVELOPMENT PROSPECTS OF VOCATIONAL TRAINING

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Dr Laszlo Alex
April, 1985.

DEVELOPMENT PROSPECTS OF VOCATIONAL TRAINING

Vocational training[+] systems vary in form from country to country. They range from almost exclusively scholastic systems operated by public authorities to various forms of state participation and to almost exclusively private economic solutions offered by enterprises.

In the German Federal Republic vocational training is preponderantly[++] practiced in the form of apprenticeship. The basis of the training relationship is a private legal contract between the training firm and the trainee. The training takes place at two places of training; hence the often used name "dual system". The practical part of the training takes place in the training firm (3-4 days per week) and the theoretical one in a vocational school (1-2 days per week). The central constituent of the German training system is work-related learning.

This brief description of the German system seems to me to be important for some of my following arguments; I repeat: for some, because many development trends, independent of the organization of vocational training specific to the individual Länder, are also valid. This is the result of the fact that vocational training stands on the boundary between the school system for general education and the employment system and thus is exposed partly to the same influences in all the Länder. Due to its position as a'binding link' its development depends on economic development and the development of the labour market, and especially on the effects of technical development, on demographic development, and on changes in the sphere of education.

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[+] It is defined as: learning activities which contribute to successful economic performance.

[++] From one class 10 % complete today vocational training (mostly in the form of a one-year vocational school), 5 % complete vocational training in a school, 35 % apprenticeship, 25 % a specialized vocational school and apprenticeship, 5 % apprenticeship with A-level, 5 % apprenticeship and university education, and 15 % university education.

## 1. Economic and labour market development

Economic development and the development of the labour market have a substantial influence on the demand for training and on the offer of training places. The development of the employment structure considerably influences the offer, but also the demand. Training places for occupations with a comparatively high employment risk and unfavourable working conditions are seldom in demand, even with a continuing scarcity of training places. Reversely, training courses for what are called good jobs are in great demand even in low-birthrate classes.

The structure of the employed according to individual economic sectors had changed, much in accordance with the three-sector hypothesis of Clark and Fourastié, from the primary sector (agriculture, mining) to the secondary (manufacturing) and the tertiary sector[+]. The change in employment trends in the manufacturing industry (industry and manufacturing crafts) set in with the 1973 recession; from 1973 to 1981 this sector of the economy lost 1.1 million jobs, while increased employment was recorded by private services and the

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[+] Contributions of the three economic sectors to the gross domestic product (GDP) and shares of employed, German Federal Republic, selected years, in %

| Sector / Year | Primary sector[b] Contrib. to DGP | Primary sector[b] Share of employed | Secondary sector[c] Contrib. to GDP | Secondary sector[c] Share of employed | Tertiary sector[d] Contrib. to DGP | Tertiary sector[d] Share of employed |
|---|---|---|---|---|---|---|
| | (1) | (2) | (3) | (4) | (5) | (6) |
| 1950[a] | 9.6 | 23.1 | 50.8 | 42.4 | 39.6 | 34.5 |
| 1960 | 5.8 | 13.7 | 53.5 | 47.9 | 40.8 | 38.4 |
| 1970 | 3.4 | 8.5 | 52.8 | 48.8 | 43.8 | 42.7 |
| 1981 | 2.2 | 5.4 | 43.8 | 43.5 | 54.0 | 51.1 |

a) Without Saarland and Berlin (West)

b) Aggriculture and forestry, fishing, animal husbandry

c) Mining, manufacturing, building industry, power economy (including water supply)

d) Transport and communications, trade, loan institutions and insurance, house renting, the state, other services

state sector. This is also connected with the (up to now) slow rise in productivity in these sectors. The high employment losses in the manufacturing industry are mostly due to unfavourable general economic conditions such as changes in oil prices and, to a lesser extent, to an increase in dismissals caused by rationalisation measures. "The greatest decreases in employment in the 1907s were experienced preponderantly in those branches which introduced a minimum of micro-electronic equipment. However, branches which make great use of micro-electronics have, on the whole, only slightly reduced, or even raised[+], their employment figures since 1973".

The development of the occupational structure partly reflects sectoral development. This applies above all to the primary sector. Since the early 1960s[++] the number of employed in agricultural jobs has dwindled to just two thirds, - from 2.2 million to 1.4 million. The same development could be observed among coal- and ore miners (a drop of 240,000 or 66 %). Trends in the manufacturing trades varied. There was a great decrease in textile and clothing trades (-59 %) and in leather manufacturing and processing (- 61 %), but declines were also recorded in the building industry (- 28 %).

Locksmiths, mechanics (+ 9 %) and electricians (+ 20 %) gained in importance.

In general, in the manufacturing sector the following trends of change in work tasks could be observed:

- Decrease in manual functions such as manual work, manual transport;
- Increase in functions directing and controlling production processes (operation, maintenance, control and adjustment of machines);
- Increase in, and growing independence of, maintenance jobs;
- Expansion of technical work tasks preparing the production process;
- Expansion of planning, organizational and administrative functions[+++].

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[+] Institut für Weltwirtschaft, Kiel, Im Anpassungsprozess zurückgeworfen, Zweiter Strukturbericht 1983, p.106

[++] From 1961 (census) to 1982 (micro-census)

[+++] Comp. H.v.Hennings, M.Tessaring: Entwicklungstendenzen des Facharbeitereinsatzes in der Bundesrepublik Deutschland, published by Bundesminister für Bilding und Wissenschaft: Materialien zur Bildungsplanung, 2, 1977

In services one can distinguish three groups according to trends in employment:

In the 1960s till the 1973 recession the retail sector (shop assistants etc.) recorded a slight increase followed by stagnation.

Organizational, clerical and administrative occupations explaned very notably in the 1960s (+3.4 % p.a.), while in the 1970s the rates of increase showed a marked decline (+1.2 % p.a.).

The third group finally comprises social and educational professions and occupations in the health services where the number of employed went up both in the 1960s (+5.8 % p.a.) and in the 1970s (+4.9 % p.a.). The fears that the recession in the 1970s and the early 1980s and the introduction of new techniques would lead to a rejection of the existing occupation structures and to an interruption of long-term development lines, have so far not proved justified. However, marked shifts are perceptible: the number of electricians has sharply increased, but so has also that of mechanics, while the number of locksmiths has decreased. The number of persons employed in planning and laboratory occupations (engineers, technicians, foremen) has also gone up at a rate exceeding the average. In the sphere of clerical occupations there have been obvious increases in data-processing and clerical personnel. The number of accountants and secretaries, typists and data typists, however, has gone down.

For future development the following trends may have great probability:

In the sphere of commodity demand there still continues the trend towards higher-priced commodities and services. This is a result both of a change in the attitude of consumers in a wider sense (transition from society of services to society of information) and of the volume and structure of the foreign relations of the German economy. In connection with the strong international competition, this development demands from companies a high-level technical know-how and a flexible production and work organization. Both promote the trend towards a higher qualification of the employed.

Articles of the raised level of leisure-time consumption will also continue to expand strongly. The higher-than-average growth of the building and do-it--yourself markets (increase in turnover in the late 1970s up to 100 % p.a.)

is a proof of this. What effect the change to ecologically recommended productions will have on employment cannot yet be foreseen.

The sector social services/health and the production and distribution of media may in future as in the past also stand on the "gaining side" of employment development. However, in the sphere of education, with the generally diminishing student population and the strained public finance situation, a growth of employment can hardly be expected. This applies in many respects to the sector of public administration as well.

In general, the advance in employment in services will continue. This assumption is based less on an uncritical acceptance of the expansive development in the sector of services in the United States than on a growing utilization of modern information and communications technologies in the coming decade.The wide range of possible applications of these techniques in the sphere of services will not be possible before the late 1980s, because the infrastructures required for their utilization are only now being devised (cable system, satellite transmission). Also the relocation of services, previously provided within industrial enterprises, may continue (e.g. soft-ware offices). Certainly, it is questionable if the expansion of employment in the services sector is sufficient to compensate for the loss of jobs elsewhere.

The effect of the new techniques on employment is the subject of a wide, partly even controversial, discussion in all industrial countries. Today, more than before, a policy is wanted which would promote the economic and social chances of the new technologies and help to avoid their adverse social effects. These tasks also apply to educational policy and especially, to vocational training in the boundary position to employment.

## 2. Technical development

Technical development influence vocational education in two ways: once through the demand for (trained) skilled personnel, and secondly through changes in the conditions of work-related training/school education, i.e. in the process of training for eccupational qualifications.

The level of utilization and the rate at which new technologies penetrate into the working world are grequently overrated. In 1979, only 5.8 % (1.3 mill.) of

the total German working population were occupied mainly (not only occasionally) with highly mechanized or automated activities, i.e. they worked preponderantly with "computer-controlled equipment" such as electronic data-processing (EDP) appliances, numerically controlled (NC) machines etc. Another 5.6% of the working population worked mainly with machines of a "higher level" of mechanization or automation[+]. According to the investigations of the Institute for Labour Market and Occupational Research, technical and organizational changes in industry have affected about 3% of the employed per year. About two thirds were given other jobs within the same enterprise, one third were dismissed. The external balance of employment (employments - dismissals), however, remained favourable. Nor do statistical data in the early 1980s indicate any drop in employment due to technical development.

What can be said about the future?

The expansion of modern techniques will hardly accelerate. The economic and social dependence of the diffusion of techniques is often overlooked; as a rule, the new machine must first be "earned" through depreciation. A recently completed investigation[++] about the inter-relation of computer-aided drawing and designing (CAD) and the also computer-aided manufacturing (CAM) has shown that the introduction of new techniques is progressing at a slower rate than often expected. Problems with hardware and software, high investment sums and organizational difficulties lead to considerable delays in their introduction in enterprises. One can even observe a growing waiting attitude which derives from the previously frequent mistake of a too early introduction of electronic data processing (EDP).

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[+] The data derive from joint investigations of the Bundesinstituts für Berufsbildung (BIBB) (Federal Institute for Vocational Training) and the Institut für Arbeitsmarkt- und Berufsforschung (IAB) (Institute for Labour-Market and Occupational Research) carried out among 30000 German workers and employees in 1979

[++] carried out by the Rationalisierungskuratorium der Deutschen Wirtschaft (Rationalization Board of the German Economy), autumn 1984

In general, one starts today from the assumption that only about 15 % of the possible applications of the new information technologies is actually utilized. John Diebold ("Mister Automation"), Chairman of Diebold Group, Inc. New York, declared recently that in comparison with the history of the motor-car and the motor industry which is now about a hundred years old, the computer and the computer industry have now reached a development level which corresponds with that of motor-cars and car manufacture in the 1920s. Christian Lutz, Director of the Swiss Gottlieb Duttweiler Institute (GDJ-Schriften, Nr.25), is similarly reserved in his opinion of the expansion of the computer technology. He said that an attempt to fit the currently available data on the distribution of computers into what is called a "Gompertz curve" would lead to the conclusion that it would take an economy 23 1/2 years to raise the introduction of the computer technology grom 10 % to 90 %.

About the effects of technical development on future employment there exist different views. In general, no essential ecceleration of the increase in overall economic productivity is expected in the 1980s as a result of the introduction of new technologies. However, there are more and more indications that with the current poor economic development, which may also be anticipated for the coming years, the introduction of new technologies leads per balance to a reduction of jobs. The expansion of production in the sphere of high technology is not sufficient to compensate for the rationalization effects. The positive effects on employment are often greatly overrated. In 1984, the growing industry of office and information equipment in the German Federal Republic employed a total of 84,100 persons. The increase on the preceding year amounts to 8 % or 6000 jobs. Also the entire sector of manufacturers of information equipment (in addition to office and information equipment, the sectors communications equipment, TV sets, radio and electronic ) in 1984 employed only half a million persons or 2 % of all employed.

In general, as a result of technical development and, above all, of micro-computer technology, a stagnation or a decrease in the number of personnel in major production units and an increase of employment in smaller enterprises are expected. The growing relocation of services to engineering firms and EDP offices and laboratories, services which were formerly provided within the firms, has already been mentioned. What also speaks in favour of an expansion of smaller enterprises with a growing demand for skilled manpower are the shifts in

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social requirements in highly developed national economies (growing demand for services and for high-quality, individually designed products) and the comparative cheapening of technical appliances combined with their higher flexibility, which favour small and medium enterprises, but also new enterprises.

Through micro-electronics the trend towards further automation will continue. This will also include the office sector in an increasing measure. In the opinion of experts, by the end of the century automation will affect about one half of the employed in manufacture, installation and repair work, and about 30-40 % of the employed in offices. The changes in the occupational structure should, at the same time, correspond largely to the present trend. This means that, as before, further savings are expected in manpower in the manufacturing sector among machine operators, maintenance men, store and transport personnel, and in the office and administrative sector among secretaries and senior clerks employed on simpler tasks. However, a growing damand is to be expected in the spheres of installation and repairs, measuring and regulation techniques, data processing, and in the sphere of management, technical counselling, research and development.

The advancing automation will affect above all low-skilled workers. Wherever till now men have performed simple regulating functions, as for instance monotonous servicing or installation of machines/equipment or dull information processing tasks, like the collection and sorting out of data, these function will in future be taken over by automatons. A certain duality in occupations affected by the new techniques begins to emerge: on the one side there are central occupations, in which DP experts or skilled personnel of the NC/CNC or CAD techniques[+] are employed, and on the other there is a whole range of mixed or marginal occupations in which work on new apparatus and machinery becomes an essential part of occupational practice. This suggests a similar division of functions as between motor-mechanics and motor-car drivers as a result of growing motorization. The driver need not possess special "motor knowledge" to be able to drive a car. Most of the users of micro-electronics in mixed and marginal occupations are, in a figurative sense, motor-car drivers to whom not so much the technique itself, but rather its operational field must be known.

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[+] NC = numerical control
CNC = computer numerical control
CAD = computer assisted design

Due to the advance of micro-electronics there is also a certain convergence of occupational demands. While previously every occupation had its special tools, the skilled handling of which proved the user a specialist in his field, the computer is now becoming more and more a universal tool. Its handling is formally hardly different, regardless whether the computer controls a chemical process, a transport system or a workpiece.

With the spread of new techniques both in the industrial and in the commercial sphere - as far as can be foreseen today - new occupations will emerge only sporadically. However, there will be shifts in the qualification structure because the new techniques change the demand profiles. Components of demand, such as ability for abstraction, knowledge of systems, responsibility for men and machinery, reading ability and ability to express oneself, and wider qualifications such as basic technical knowledge in commercial jobs and basic commercial knowledge in technical jobs acquire greater importance. Applicable basic knowledge of informatics will in future be regarded as the necessary "craft tool" of every skilled worker or businessman. The ability quickly to acquire "production knowledge" of new technologies is going to be in increasing demand in the future. However, knowledge specific to a trade will also undergo changes. For example, due to the advance of micro-electronics in many metal-working occupations general knowledge of electronics will be damanded. Almost independently of branch, size of enterprise and production method, the volume of data processing activities (requirements) is growing. Summing up briefly the effects of technical development on employement and the qualification structure of the employed, one may say that the advancing mechanization/automation tends to promote the process of higher qualification. It does so especially when the possibilities of work organization created by technical development are utilized. This can be observed quite clearly in the case of the use of machine-tools. While the NC-machine assigned the skilled worker rather a passive, even dequalifying, role, the CNC machine, through the controlling computer, offers him the possibility to intervence in the program. The transfer of problem solving to work preparation or the programming office as observed in the case of NC machines can now be shifted back to the macine operator by means of the CNC technique, combined with suitable work organizational measures. A similar situation can be observed in the case of the senior clerk who - through the modern office technique - becomes again a "case clerk".

In general, the new technologies raise the degree of freedom of work organiza tion. The technical formation possibilities help to uncouple man-man and man--machine systems and thus also to bring about flexibility and individualization of work relations.

However, decisive for the higher qualification process are not only technology and the resulting increased organizational "free spaces", but also the off of skilled manpower. The organizational form in which the technique is used depends decisively on the available qualifications. It is here that the primary tasks of vocational training lie, even though it can only conditionally ensure an anticipatory performance as regards the demand for qualification made necessary through technical development. Generally valid training regulations (prescriptions) can be issued or agreed upon only when a new technology is regarded as "introduced" and the abilities and skills connected with it can be estimated. That this cannot be done at a time when the new technique is introduced in the economy for the first time, is made clear by the fo lowing, often quoted "diffusion model". The model differentiates between "knowledge of origination" (research in enterprises and state institutions), "production knowledge" (training by the manufactures and users of the new technology) and "every-day knowledge" (offered by institutions of the general educational and vocational training system[+].

As regards new technologies we may at present be in the stage of "production knowledge" where the manufacturers of the new system are the first instructor We are undertaking measures to let the new technologies become "every-day knowledge" through the educational system. These efforts will determine our planning and actions in the general and occupational education in the coming years and, at the same time, seek to eliminate narrow, highly specialized training. A Broad basic occupational education and vocational training based on it offer the basis for meeting the qualification demand arising from the technical change. It is also indisputable that basic occupational training must be more enriched with contents (language, mathematics), which have so far been rather ascribed to general education, because these "cultural techniques" are also increasingly becoming "craft tools" in almost all professions. There is no doubt that basic knowledge of information technology will in future have to be added to basic education or to basic vocational training

[+]Battelle: Mikroprozessoren im Bildungswesen (Microprocessors in Education), Munich 1980

because it will be required in all occupational activities of men and even affect man's leisure time.

In vocational training increasing emphasis is laid on teaching learning techniques which make possible a later resumption of qualification courses and the learning of other, wider skills such as system thinking, abstraction ability, creativity. However, these abilities cannot be taught and applied in isolation, but only in close connection with training for qualification specific to an occupation, i.e. in the form of training on the work object.

Technical development, the resulting capital-intensification of jobs and the specialization needed for maintaining competitiveness make the conditions of work-related training more and more difficult. The difficulties relate to the integration of the trainees in the practical work process (work-related learning). What, because of the complicated process or the high cost of equipment, can no longer be "shown how it is done", or what is no longer practiced in the workshop, can no longer be learned by "watching and imitating". Since in large plants, because of the growing automation, basic vocational on-the-job training in technical occupations is possible only in a small measure, and since training has been largely transferred to training workshops of the individual enterprises, it is becoming increasingly difficult even in small and medium-sized enterprises fully to teach the new technologies at the work place. However, the still manifold possibilities for on-the-job training, which - despite this development - exist in small and medium enterprises because of these enterprises' different work organization, must be kept up. The new technologies require a greater measure of additional training in training institutions outside the enterprises or in occupational schools. The form of organization known as "Ausbildungsverbund" which is increasingly practiced in the Federal Republic - chiefly by major enterprises (the training is provided by several entriprises depending on their respective specialization) - offers possibilities for this purpose. As always in efforts at overcoming special problems of training, suitable teaching aids can greatly help in the introduction of new technologies in enterprises and administrations. Besides the traditional audio-visual media, simulation apparatus can be applied here most successfully.The overcoming of technical challenges finally requires a wide offer of possibilities of further education for skilled workers and employees, but above all for instructors and teachers. In the case of teachers, because of the need for a

basic understanding of technical processes in practice, it will be imperative to attend practical training in productive and services organizations.

In connection with the technical and economic changes let us mention in conclusion another two developments essential for vocational training. The first relates to working time. The weekly, annual and life working time has been considerably shortened over the past twenty years. Proposals for solving current problems of the labour market take into consideration a further shortening of the annual and/or life working time and an increase of part-time employment. At the same time the continuing reduction of working time, combined with flexible, comparatively inexpensive home-work tools, enhances the possibility for a production of goods and services "outside the market" (shadow economy). The acquisition of personal identity through work is shifting increasingly to performance in spare time, to man's role outside hid occupation, and to his voluntary activity in society. Thus the problem also arises how to construct educational and socio-political guiding patterns out of the "work remainder". Also the live teaching/showing which is so important for imitation in the educational and training process must be newly determined in a "leisure society", in a "society whose pattern of values in less occupation-oriented". What stands in the foreground is no longer, or no longer exclusively, qualification for occupational work, but competence for forming one's life work between paid work, social work and personal work. General and occupational education are moving closer together while traditional technical knowledge and skills acquire a new meaning in the self-determination of work.

The second development is connected with the miniaturization of the new techniques and the utilization of modern communications techniques. It opens the way to decentralization in the working process and can lead to a shifting of work performance out of the occupational system into self-service and personal work. In some spheres this can also put an end to the spatial separation of place of work and place of residence. Some American institutes proceed from the assumption that in the early 1990s about 15 to 20 % of the American employees will be working at home.

3. Demand for training places

The demand for training places is regulated by demographic development (size of

age group) and by young people's attitude to training. The influencing factors range from which social class the young person belongs to (change in social stratification) and what school he/she has attended, to offer of training places. Especially the latter has played a substantial role in the German Federal Republic for several years now. The great readiness of enterprises to provide training place - so unexpected because of the comparatively unfavourable trade outlook - has fortified many young people in their efforts to obtain training. Here, however, we shall deal only with two factors: demographic development and school development.

The demographic development in the German Federal Republic has not differed much from that in many other European countries, though there have been certain "phase shifts". The high birthrate of the post-war period in the Federal Republic reached its peak level only in the mid-1960s (in the other countries much earlier) and the decline has since been more marked than in the other countries. As a result of this development the average annual number of young people leaving schools for general education from the mid-1970s till the early 1980s was higher by 150,000 than it was from 1965 till 1975. In the years 1980-1983 the peak totalled about one million school leavers. By 1990 their number will have declined by 300,000. The lowest level is expected to be reached in 1994 (650,000).

The demand for training places follows this development with a certain delay. This means that vocational training, like the rest of the school system, has been exposed to extremely great fluctuations in demand since the mid-1970s and that this trend will continue.

The number of persons seeking training places in enterprises rose from 585,000 in 1977 to 764,000 in 1984. As offer lagged only slightly behind this development, the number of new contracts could be raised in 1984 by 150,000 to a total of 705,000. All sectors of training participated in this increased offer, though the greatest expansion was recorded in those sectors (occupations) in which a rising demand requires only insignificant or no special investment (e.g. the occupations of shop assistants; hairdressers, bakers, butchers, medical assistants). However, in these occupations the employment level has mostly been declining for a long time. The discrepancy between the structure of training and the structure of employment of graduates of the dual system has

therefore become more marked. This is valid independently of the changes deriving from technical development which have been outlined before. Although the widening of the offer to provide training places for generations with a high birth rate is highly welcome, one should not close one' eyes before its consequences. These include a growing number of persons who change their occupations, and an increasing need for re-training/requalification in the future.

And now to school development. As part of the last years of secondary education the dual system is exposed to developments in the sphere of school education on two sides. On the one side it competes with other educational insitutions, especially with grammar schools (and through these with universities); on the other, schools for general education and, partly, full-time occupational schools[+] are early suppliers of partical vocational training. The development in schools influences not only the level of performance but also the inclination of pupils for a particular type of training. The number of persons with a higher level of school education who look for training places is increasing from year to year. This is partly due to the changed structure of school leavers and partly to the growing attraction of dual training for those with better school qualifications. While in the early 1960s school leavers who have, or have not, completed an elementary or special school, still accounted for 60 % of a certain age group/school-leaver group, they now account for only 40 %, and this proportion will be even lower in the years to come. Exactly the same applies to the proportion of school leavers with completed secondary education or university entrance level. The rising number of school leavers with higher school education, because of the close connection between what level of schooling and what type of training they want to attain, changes the structure of demand for training places. Preference is given to clerical, administrative and technical occupations, while enterprises - traditionally in the Federal Republic - offer mostly industrial training places. As a result of this shift in demand the already existing bottlenecks in the indicated occupations may become more frequent or even more serious. The change in the structure of school leavers leads not only to a shift in the structure of the demand for training places but also alters the demands )requirements) of the young regarding form, methods and contents of training. A-level graduates, of whom already now one in every four completes a practical training course, have different demands on training as regards content and teaching than have, for instance, pupils of

secondary schools. The demands on, and the mental strain of, the training personnel, because of their growing age and the increasing heterogeneity of the education of trainees will presumably appreciately increase.

4. Demands on occupational education in medium-term perspective

The described developments change the volume and structure of vocational training and put on it new demands. The rising qualification of school leavers, combined with economic and technical development such as the increasing spread of information and communications techniques, intensify the trend towards a general higher qualification. The process of higher qualification is accompanied by considerable organizational shifts. These change the demands at the work place. New demands regarding technical knowledge, but also regarding attitude, emerge. The manual and technical skills learned during training and expected before from many skilled workers will in future be less required than the ability to understand the interaction and interdependence of operations as a whole, to plan prudently, and to eliminate and program work processes. To a certain degree this applies to the senior clerk as well. The damands on him include a growing motivation for learning, combined with abilities for widening, deepening and changing of qualifications, parallel with his/her particular occupation. All this requires -

- that basic occupational education becomes enriched with contents (language, mathematics, also rhetotics) which have so far been primarily ascribed to general education. This also includes basic knowledge of information technology, because this technology will touch practically all occupational activities and even spread to the sphere of leisure;

- that vocational training, in addition to contents specific to an occupation which - due to the advance of micro-electronics - also include software handling and the installing and servicing of micro-computer systems in many occupations, provides wider qualifications such as compability of abstraction, objective and consistent thinking and planning, but also abilities for co-operation;

- that vocational further training becomes expanded. An increasing role in this is to be played especially by a combination of work-related training and systematic learning processes in employers' establishments or in institutions elsewhere, possibly supplemented by vocational instruction by correspondence.

A special target group of the measures for further training are instructors and teachers.

The increasing specialization and the growing capital intensity of jobs connected with technical development reduce increasingly the possibilities of visual practical learning even in small and medium-sized enterprises. However, because of its high paedagogic but also technical value, work-related training should be kept up. The teaching of new technologies therefore requires that on-the-job instruction becomes supplemented in a greater measure with instruction through educational institutions outside enterprises or through vocational schools. The organizational form newly practiced in the Federal Republic and known as "Ausbildungsverbund" would suit the purpose. All these measures result in a growing demand for co-operation between places of learning, i.e. between instructors and teachers in the various institutions.

The planning and promotion or work-related vocational training in the Federal Republic is a "joint action" of enterprises, trade unions, state authorities and vocational training research. The close co-operation[+] of all these factors is an essential feature of the "German model of coational training" and also a guarantee for a successful solution of the problems facing us.

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[+] It is institutionalized in the Bundesinstitut fUr Berufsbildung (Federal Institute for Vocational Education) on which employers, trade unions, the federal government and the Länder governments are equally represented.